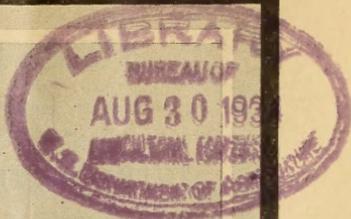


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Crested Wheatgrass



Leaflet No. 104
U.S. Department
of Agriculture

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CRESTED WHEATGRASS

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INTRODUCTION INTO THE UNITED STATES

Crested wheatgrass (*Agropyron cristatum* Gaertn.) is a hardy, drought-resistant perennial bunch grass, native to the cold, dry plains of Russia and Siberia. The first recorded introduction into the United States was made through the efforts of the United States Department of Agriculture in 1898, but the possibilities of the grass did not attract much attention until after 1915, when it was sown in the northern Great Plains, where it proved especially adapted.

DESCRIPTION AND CHARACTERISTICS

Crested wheatgrass is closely related botanically to slender wheatgrass (*A. tenerum* Vasey) and western wheatgrass (*A. smithii* Rydb.), both native to the northern Great Plains. It is a typical bunch grass, differing in this respect from western wheatgrass and brome grass (*Bromus inermis* Leyss.), both of which spread by underground rootstocks and tend to develop a uniform turf.

A wide range of types is found in commercial seedings, but typical plants have a dense, dark-green foliage during the early part of the season. After heading, the plants appear less leafy, but the stems are fine, and when harvested early the grass makes hay of excellent quality.

The seeds of some plants have pronounced awns, while those of others are awnless or practically so. Seeds with long awns are objectionable, as they have a tendency to hang together and do not feed readily through the drill.

Crested wheatgrass has a longer productive period than slender wheatgrass or brome grass and under favorable moisture conditions has yielded well for 10 to 15 years or more. In comparable tests brome grass and slender wheatgrass have frequently yielded more the first 2 or 3 years, after which the slender wheatgrass tends to die out and the brome grass becomes sod-bound, while crested wheatgrass continues to produce satisfactorily, provided moisture conditions are favorable. At the Northern Great Plains Field Station, Mandan, N.Dak., a seeding made in rows in 1915 produced more in 1933, its eighteenth year, than brome grass, slender wheatgrass, or later seedings of crested wheatgrass.

Crested wheatgrass is able to grow at low temperatures, and as a result makes earlier and more rapid growth than other grasses with which it has been compared. This characteristic is probably due to its extensive root system, which permits storage of abundant food reserves and ready utilization of water. The grass has a tendency to become dormant during hot, dry periods, but seems to suffer no permanent injury, growth being resumed upon arrival of the cool days of autumn, and with a favorable moisture supply continuing until late in the season. Its ability to grow at low temperatures

¹ The writer is indebted to J. T. Sarvis, Mandan, N.Dak., Leroy Moomaw, Dickinson, N.Dak., and M. A. Bell, Havre, Mont., for suggestions in the preparation of this leaflet.

enables it to utilize the soil moisture to such an extent as to check the growth of other grasses and weeds where the moisture supply is limited.

In thin seedings, individual plants tend to enlarge, sometimes becoming rough and bunchy, especially where there is much soil-blowing. The grass is more easily killed by plowing than brome-grass, and, therefore, is better suited for growing in rotations.

ADAPTATION

Crested wheatgrass is especially well adapted to the northern Great Plains, where the temperatures are severe and the moisture supply is limited. It is one of the most promising dry-land grasses for eastern Oregon and Washington and northeastern California. In Colorado crested wheatgrass is reported to give good results as a pasture crop at altitudes of 5,000 feet or more, but it has not appeared promising at lower altitudes. At the United States Dry Land Field Station, Akron, Colo., it has proved to be the best of available pasture grasses, although far from satisfactory for pasture. The grass has some possibilities as a seed crop in that locality when grown in cultivated rows.

The results from limited tests with crested wheatgrass as a dry-land crop for Kansas have not been sufficiently conclusive to permit specific recommendations. In tests at Hays, Kans., it has not appeared promising, but has given good yields under irrigation near Garden City, Kans. In the eastern part of the State, where moisture conditions are more favorable, other adapted grasses are doubtless superior. Until further information is available regarding the value of the grass in Kansas it is suggested that prospective growers test it experimentally before sowing any considerable acreage. Crested wheatgrass is being tested in pasture mixtures in some of the humid northern States, where it gives some promise. As a result of seedings made by farmers in many other parts of the United States, more definite information regarding its limits of usefulness should soon be available.

There are no records of an established stand of crested wheatgrass having been killed by cold or drought where the grass is adapted. Although it has survived the most severe drought of the northern Great Plains the grass is not productive during extreme heat or drought. It remains dormant during such periods, growth being renewed when rains occur. Available results seem to indicate that with 18 or more inches of rainfall properly distributed, brome-grass may yield as much as, and alfalfa may yield more than, crested wheatgrass.

Crested wheatgrass does not appear promising for the southern half of the United States except possibly at high altitudes. Under the more favorable moisture conditions of the Eastern States it is not equal to timothy and other adapted grasses.

The grass does well on productive soils of almost any texture ranging from light sandy loam to heavy clay.

SEEDING

Crested wheatgrass, being tender in the seedling stage, requires favorable conditions for germination and early growth. A firm seed

bed well supplied with moisture and comparatively free from weeds is essential to a satisfactory stand. It is generally easy to secure these conditions following a crop of corn or after summer fallow. Where the moisture supply is more favorable a good seed bed may be prepared on fall- or spring-plowed grain stubble. The land should be worked down well, smoothed with a spike-tooth harrow, and packed, if necessary, just before seeding.

The most favorable time to sow crested wheatgrass varies with the locality and the season. The usual practice is to sow in the spring at about the time spring wheat is sown, as moisture conditions are likely to be most favorable at that time. Where weeds are abundant better stands result from seedings made late enough to permit 2 or 3 cultivations with a disk harrow, a spring-tooth harrow, or a duck-foot cultivator before seeding; in this way many of the weeds are killed. In most of the region to which the grass is suited even delayed seedings ordinarily should be made not later than June 1. While spring seedings are much to be preferred, fall seedings often give good results where moisture conditions are favorable, though sometimes such plantings are subject to injury from cold or drought or grasshoppers. In parts of eastern Washington fall seedings have generally proved more satisfactory than spring seedings. In this region it is generally advisable to drill the seed in grain stubble, which tends to check soil-blowing during the winter. In the northern Great Plains fall seedings should be made not later than the early part of September.

Crested wheatgrass may be sown in close drills or in rows wide enough apart to be cultivated. Where the crop is to be utilized for hay or pasture, close drills are preferable, except where the moisture supply is very limited. The seed should be sown with a grain drill and covered about one half inch (fig. 1). The double disk drill is preferable to the single disk drill, as it does not cover so deeply. While the seed runs through the drill more freely than seed of most other grasses, it is advisable to watch closely to see that none of the cups or spouts become clogged.

If grown mainly for seed production, the grass should be sown in rows and kept cleanly cultivated, since with a limited moisture supply more seed of better quality can be produced in rows than in close drills (fig. 2). The seeding may be made in single rows or in double rows. In single rows the seed is dropped from one spout of the grain drill, and in double rows from two adjacent spouts which are usually 6 or 7 inches apart. The latter method is preferable since skips are less likely to occur. The most satisfactory distance between rows is 36 to 42 inches for either single or double rows. The grass may be grown in rows for hay in areas where the rainfall is very limited, but under most conditions close-drill seedings are preferable for hay or pasture. Hay produced in rows is likely to contain considerable dust and dirt, and the increase in yield, if any, usually is not sufficient to offset the poorer quality of hay and the extra labor involved in keeping the rows cleanly cultivated.

The usual rate of seeding in close drills is 10 to 12 pounds per acre. To seed crested wheatgrass at this rate, the grain drill should be set at about one half the rate usual for seeding wheat, as a trial, and then adjusted to seed more or less according to needs. Where the

moisture supply is limited, heavier seedings result in decreased yields. In cultivated rows 2 or 3 pounds of seed per acre is ample for single rows and 4 to 5 pounds for double rows 42 inches apart.

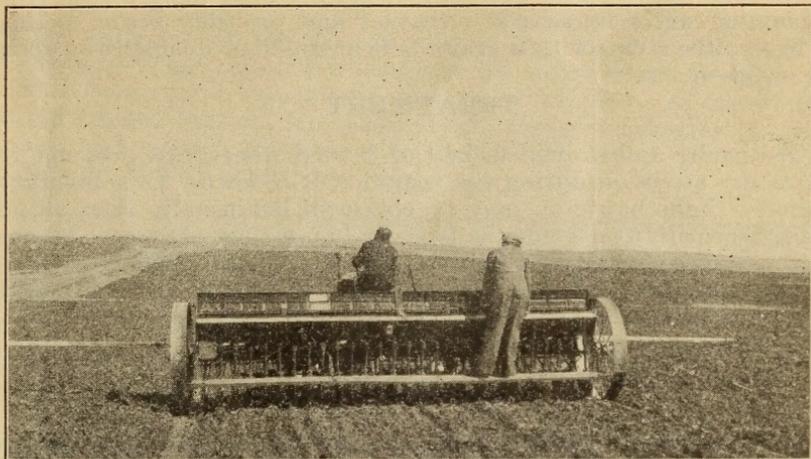


FIGURE 1.—Seeding crested wheatgrass, Dickinson, N.Dak.

Under dry-land conditions it is generally safer to sow crested wheatgrass without a nurse crop. Where the moisture supply is

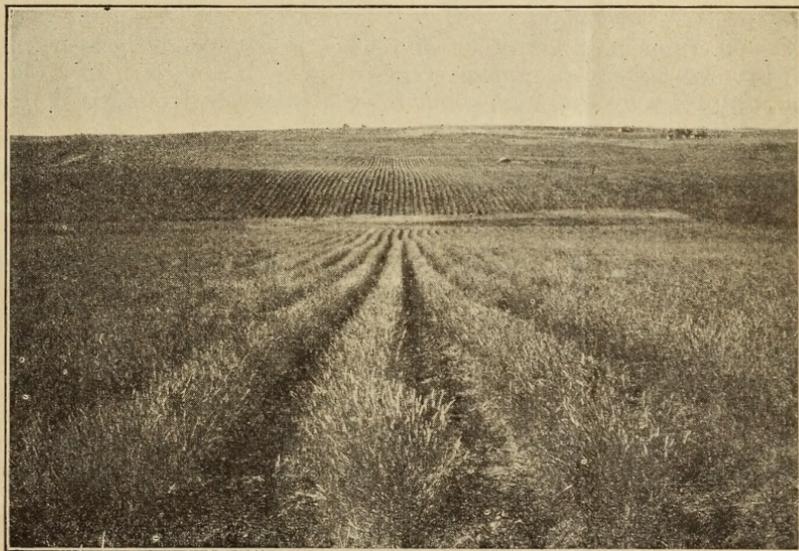


FIGURE 2.—Crested wheatgrass in rows for seed production, Dickinson, N.Dak.

favorable good results are usually obtained when seedings are made with a nurse crop of wheat or oats sown at about one half the usual rate.

Where it is desired to seed a considerable area of abandoned farm land as cheaply as possible, seeding in strips and permitting the

plants to mature and the seed to shatter, so that the entire area is eventually covered with volunteer plants, has some possibilities. The strips should be about 100 feet apart and at right angles to the prevailing winds. The seed may be sown with a hand seeder from a moving car or horseback. Another and probably better method is to seed the strips with a grain drill in single or double rows about 36 inches apart.

TREATMENT

Ordinarily a close-drilled field of crested wheatgrass does not require any attention during the year that it is sown. In a favorable season a light hay crop may be obtained; but usually there is not enough growth to pay for the labor of harvesting. If weeds become very troublesome the field may be clipped, but ordinarily it is better not to mow during the year of seeding. After the first year weeds give little trouble in close-drilled fields. Row seedings require 2 or 3 cultivations during the season.

UTILIZATION

In the areas to which it is adapted, crested wheatgrass fills a unique place as a pasture grass, and it is probable that its greatest usefulness will be for this purpose (fig. 3). In palatability the hay compares most favorably with the high quality of western-wheatgrass hay. Analyses of plants cut at different stages of growth show that crested wheatgrass has a higher nutritive value at most stages than slender wheatgrass or bromegrass.

The average analyses of crested wheatgrass, slender wheatgrass, and bromegrass cut at various stages of growth are given in table 1. The samples were taken at about 2-week intervals from April 10 to August 25.

TABLE 1.—Average composition of crested wheatgrass, bromegrass, and slender wheatgrass

Kind of grass	Ash	Ether extract	Crude protein	Crude fiber
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Crested wheatgrass.....	7.02	2.33	14.25	24.86
Slender wheatgrass.....	8.00	2.27	11.67	27.48
Bromegrass.....	8.65	2.24	13.23	23.32

The hay is eaten readily by all classes of livestock, horses being particularly fond of it and often preferring it to bromegrass hay. If the best quality of hay is to be obtained, the grass should be cut shortly after it comes into bloom. The hay cures readily, and with favorable weather can be stacked or stored soon after being mowed. Where the grass is adapted, yields have ranged from three fourths of a ton to 1 ton of cured hay per acre over a period of years, with considerably higher yields in the more favorable seasons.

Crested wheatgrass is a very valuable pasture grass in the northern Great Plains when used in mixtures or in combination with other grasses or legumes that provide more feed during the heat of summer when crested wheatgrass is dormant. The use of mix-

tures results in prolonging the grazing season, as the crested wheatgrass starts growth several days earlier in the spring than other grasses; and when moisture is available continues to grow later in the fall.

In grazing tests conducted in cooperation with the Bureau of Dairy Industry at the United States Dry Land Field Station, Ardmore, S.Dak., crested wheatgrass for dairy cows proved superior to bromegrass, sweetclover, and native pasture. At the Judith Basin Branch Station, Moccasin, Mont., crested wheatgrass, bromegrass, and sweetclover have given practically equal returns from pasturing, and all three were superior to native grass.



FIGURE 3.—Cattle grazing on mature crested wheatgrass in the Judith Basin, Mont.

Crested wheatgrass has an important place in the crop-replacement program in the areas in which it is adapted. It has been used with good results in reseeding depleted ranges and abandoned plowed areas. The grass also has a place on dry-land lawns, golf courses, and airports, where the finer turf grasses cannot be maintained, and for seeding right of ways along highways where a permanent growth is needed to control coarse weeds.

SEED PRODUCTION

Crested wheatgrass has good seed habits as it yields well, ripens early, and can be harvested with machinery available on grain farms. As the seed ripens while the plants are still green, the straw is of considerable value for feeding. Because crested wheatgrass seed shatters readily, harvest should begin when the earliest heads begin to shatter. Much of the seed may be lost in windy weather if the grass is allowed to become too mature. The crop may be cut with a grain binder, and should be shocked immedi-

ately (fig. 4). Under normal weather conditions, 10 days in the shock is sufficient for drying before threshing. The seed is easily threshed with an ordinary grain separator (fig. 5). To avoid loss



FIGURE 4.—Harvesting a seed crop of crested wheatgrass, Dickinson, N.Dak.

of seed in threshing, the speed of the fan should be reduced or the air intake to the fan closed. With some separators it is desirable to lower the rear of the machine from 6 to 12 inches so that the seed may pass back to the delivery and the straw be handled more satisfactorily.

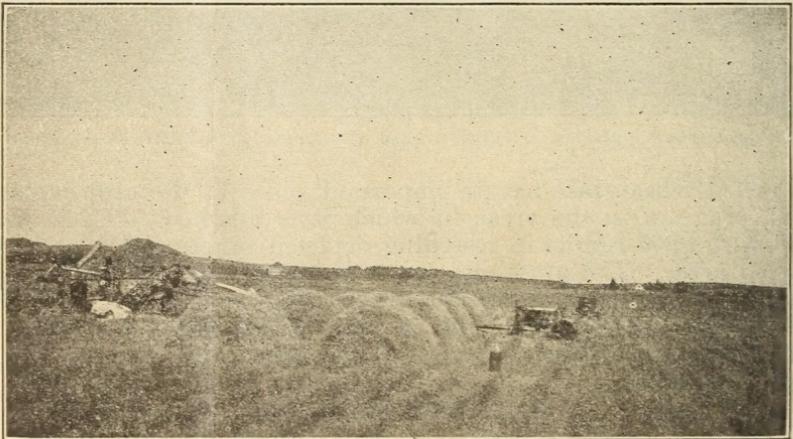


FIGURE 5.—Threshing crested wheatgrass, Dickinson, N.Dak.

Crested-wheatgrass seed can be cleaned with an ordinary farm fanning mill equipped with the proper sieves. A fair standard for crested wheatgrass seed is a bushel weight of 22 pounds, a purity of 88 to 90 percent, and a germination of 90 percent.